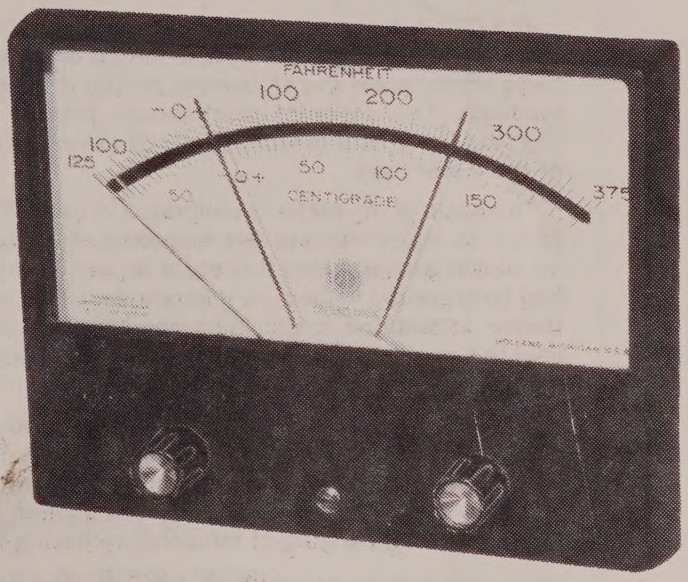

INSTRUCTION MANUAL

Temperature Indicator/ Set Point Assembly Model 013005

THERMOTRON

THERMOTRON INDUSTRIES, INC.
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Holland, Michigan 49423 U.S.A.
Phone (616) 392-7080
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TWX 810-292-6164

DESCRIPTION

Model 013005 Temperature Indicator/Set Point Assembly is designed for use with various Thermotron temperature controllers. This device provides temperature setting and indicating capabilities for these controllers.

The unit combines a precision panel meter and set point potentiometer to indicate signal level and set point on a single analog scale. The meter has a mirror scale and knife-edge pointer to permit accurate (anti-parallax) readings. Two set-point mechanisms provide a means of establishing high/low set points independently by means of setting knobs on the front of the meter case.

The scale of the meter is calibrated in both °F and °C. Its linearity is adjusted to accommodate the response of a copper vs. constantan thermocouple sensor. Since this scale is used to indicate both the set and actual temperature values, an inherent *deviation* indicating function results. Hence, in addition to providing absolute read-outs, this unit enables the user to see at a glance where the actual temperature is with relation to the set temperature.

The indicating section of the meter is provided with a mechanical zero adjustment and an electrical span adjustment. By means of these two adjustments, various meter tolerances are accommodated as necessary to diminish indicating uncertainties. This section of the unit is designed to accept a voltage analog of temperature having the following relationship:

$$-125°F/+375°F = 0v/5vdc$$

The set point section of the meter provides three set point outputs. Two of them are equipped with an index pointer which is adjustable over the full range of the meter scale by means of knobs on the front of the meter case. The third output is provided by a precision potentiometer located on the back of the meter case. The two indicating set point adjustments are normally used to establish high/low settings with the non-indicating set point being used to establish an "ambient" setting.

These set point provisions are usually applied in one of the following four ways:

a. Any one of the three may be used singly and independently where a single fixed setting is required.

b. All three may be used, with *manual* selection accomplished by means of Set Point Selector Switch, Kit 048029, or equal.

c. All three may be used, with *automatic* selection, in accordance with a time-program, accomplished by means of various cycle timers, time clocks, or punched tape programmers.

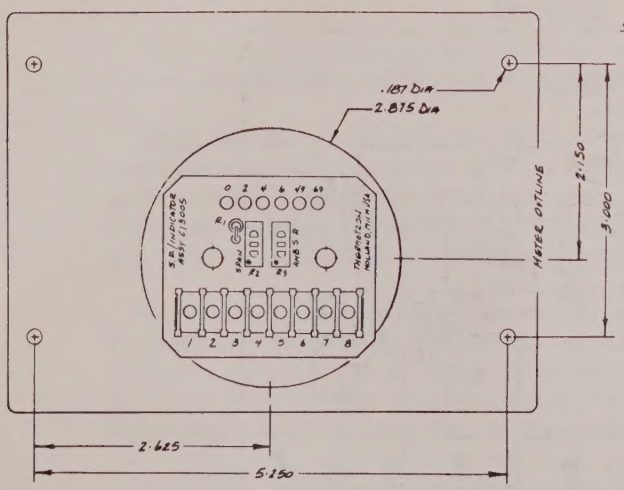
d. Methods "b" and "c" may be combined to provide for both manual and automatic set point selection.

An excitation voltage of about 5.2 vdc @ .92mA is required by the set point system in this unit. This power is normally provided by the Thermotron controller with which this unit is used. When provided with some other source, some means of adjustment should be included to enable precise setpoint calibration.

SPECIFICATIONS

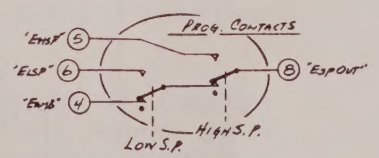
Parameter	Min	Typ	Max	Units
Range(1)	– 125		+ 375	°F
	-90		+ 190	°C
Indicating Accuracy	1.0	0.25		%
Measuring Resolution (scale readability)	0.2			%
Set Point Resolution	0.15			%
Intra Set Point Span(2)	3.0			%
Operating Temperature Range	0		+ 55	°C
Indicator Input Reqd.(3)	0		5	vdc
Set Point Excitation(4)				
Voltage	5.2			vdc
Current	0.92			mA

(1) Dual range scale.
(2) Minimum difference between high and low set points.
(3) -125°F/ + 375°F = Ov/ + 5vdc analog. Mechanical zero & electrical span adjustments provided.
(4) A remote adjustment should be provided to allow precise set point calibration.



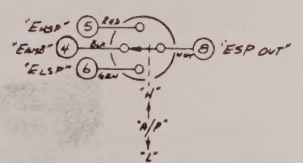
Mounting Information
(Recommended Panel Cut-out)

Program S.P. Selection:



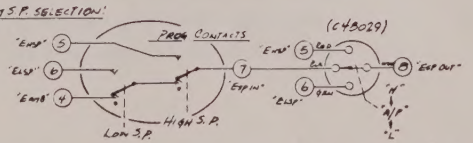
– Programmer Contacts Suited to Dry Circuit Switching. Various types of Programmers may be used, including Cycle Timers, Time Clocks and Punched Tape Readers.

Manual S.P. Selection:



043029: S.P. Selector Switch Kit

Manual + Program S.P. Selection:



* Dots at potentiometers indicate CW position of wiper; at contacts dot indicates N.O. position.

INSTALLATION AND WIRING

Mount this unit on a flat, vertical surface. Take care to prevent deforming the case of the meter. Mounting cut-out dimensions are provided in this manual, and all necessary mounting hardware is provided with the unit.

Wire the unit as follows:

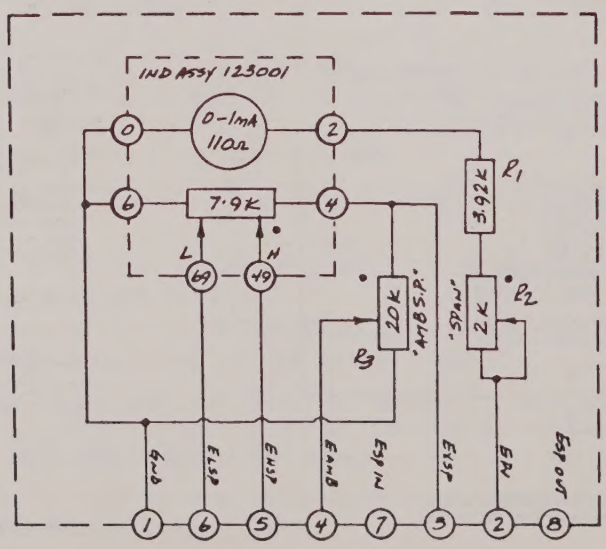
Terminal 1: "ground" from the source of the Ov/+5v temperature signal and from the source of the set point excitation voltage. (Gnd)

Terminal 2: temperature signal input, -125°F/+375°F = 0v/+5vdc, from controller or other source. (Epv)

Terminal 3: set point excitation voltage, +5.2vdc @ .92mA, from controller or other source. (Exsp)

Terminal 4: (Eamb)
Terminal 5: (Ehsp)
Terminal 6: (Elsp)
Terminal 7: (Esp in)
Terminal 8: (Esp out)

Terminal 4, 5, or 6 may be connected to the controller's set point input if only a single set point is required. For switched and/or programmed set points see wiring diagrams provided herewith, wiring terminal 8 to the controller's set point input.



CALIBRATION

If this unit is used with a Thermotron temperature controller, the calibration procedure for the controller will include calibration of this device. Otherwise:

1. With power OFF, set the mechanical meter zero adjustment to produce an indication of exactly -125°F.

2. Apply +5.00v to Terminal 2 and set *span* adjustment R2 as required to produce an indication of exactly +375°F.

3. Apply +5.20v to Terminal 3, and connect a voltmeter to Terminal 5. Set the high set point index to +375°F. Adjust the excitation voltage to produce a voltmeter reading of +5.00v.

4. Set the high set point index to the desired setting for the non-indicating set point, R3. Note the voltmeter reading, then connect the voltmeter to Terminal 4 and adjust R3 to produce this same reading.

NOTE

In the above, the (-) leads of the power supply and voltmeter should be connected to Terminal 1. A digital voltmeter (DVM) having an accuracy of ±1/4% or better should be used, since the accuracy of most analog voltmeters is not usually better than ±1%.

SERVICE

Where troubleshooting assistance is required, phone or write Thermotron—ACS Customer Service (616) 392-1492.

Users desiring to return units for service at the factory should contact Thermotron—ACS Customer Service in advance for a returned goods authorization number. Returned units should be CAREFULLY PACKED TO PREVENT DAMAGE IN SHIPMENT. Double packing (two cartons, each with excelsior all around the contents) is recommended.

All returns should be accompanied by a purchase order showing the Thermotron returned goods authorization number, return shipment instructions, the nature of the service requirement (what seems to be wrong, with as much detail as possible), and the name of a person at the customer's plant who can be contacted for further information.

All shipping related to service is handled FOB Holland, Michigan. UNITS ARRIVING AT HOLLAND IN AN APPARENTLY DAMAGED CONDITION OR WITHOUT PRIOR AUTHORIZATION CANNOT BE RECEIVED. All units accepted for service will receive immediate attention at the factory, with 24-hour turn-arounds provided in many cases. Unless otherwise specified on your order, outbound repaired units will be shipped using the same method as the inbound shipment.

Orders for service parts should also be directed to Thermotron—ACS Customer Service. All parts are normally stocked at the factory, and in most cases 'same-day' shipment can be provided. In order to expedite service and assure that the correct parts are shipped, all items should be identified by the Thermotron six-digit part number (IISS number), in addition to their noun and spec.

e.g.
052347 RESISTOR, Film 2.4K ¼w 1%

PARTS LIST

IISS	Description	Qty
052358	RESISTOR, Film 3.92k 1/4w 1%	1
054004	POTENTIOMETER, Trim 5k 25-T	1
054009	POTENTIOMETER, Trim 20k 25-T	1
123001	METER ASSY, Temp. −125°F/+375°F T	1
176008	TERMINAL BLOCK, 8-w	1
179001	SOLID PIN, PCB	6
198003	CABLE TIE, .75" max	1
272011	WASHER, Flt. #10 Nylon	4
273010	LOCKWASHER, Int. #10	2
274010	NUT, Hex 10-32 Brass	2
279001	KIT, Mounting Hdwr Assortment	1
451006	USER'S MANUAL	1

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